

CLAIM AMENDMENTS

This listing of claims will replace all prior versions and listings of claims in the application.

Amend claims 1, 11, 12 and 13 as follows:

1. (currently amended) A combiner for use in a diversity radio receiver which receives a plurality of diversity I and Q modulated signals each carrying I and Q information signals, wherein said received I and Q signal pairs are digitized at a sampling rate T and converted to baseband I and Q signals wherein each said converted I and Q signal pair represents a diversity I and Q vector for input to said combiner, said combiner comprising:
 - (a) for each sample stream of said plurality of diversity I and Q vectors input to said combiner, a discriminator configured for producing for each sample an output discriminated I and Q vector (I_{Δ} , Q_{Δ}) having a phase representative of the frequency of said information signals and an amplitude proportional to the power of said information signals;
 - (b) ~~adds~~ Adders configured for adding together, for each set of sampled diversity vectors, said discriminated I signals (I_{Δ}) to produce a combined discriminated I signal ($I_{c\Delta}$) and for adding together, for each set of sampled sample of said diversity vectors, said discriminated Q signals (Q_{Δ}) to produce a combined discriminated Q signal ($Q_{c\Delta}$), whereby said combined discriminated I and Q signals represent a combined discriminated vector ($I_{c\Delta}$, $Q_{c\Delta}$) having a phase which is determined by one or more of the phases of said diversity I and Q vectors depending upon the relative powers of said diversity I and Q vectors;
 - (c) a phase accumulator configured for adding to an accumulation vector, over successive samples, said phases of said combined discriminated vectors ($I_{c\Delta}$, $Q_{c\Delta}$) to produce an output combined I and Q signal pair (I_c , Q_c).
2. (original) A combiner according to claim 1 wherein said discriminator is a complex discriminator.

3. (original) A combiner according to claim 2 wherein said received diversity I and Q signals are FM signals.

4. (original) A combiner according to claim 3 wherein said complex discriminator is configured to perform the calculations:

$$I_{\Delta}(t) = I(t) I(t-T) + Q(t) Q(t-T) ; \text{ and,}$$

$$Q_{\Delta}(t) = I(t-T) Q(t) - I(t) Q(t-T).$$

5. (original) A combiner according to claim 4 wherein said phase accumulator is configured to perform the calculations:

$$I_c(t) = I_{c\Delta}(t) I_c(t-T) - Q_{c\Delta}(t) Q_c(t-T) ; \text{ and,}$$

$$Q_c(t) = I_{c\Delta}(t) Q_c(t-T) + I_c(t-T) Q_{c\Delta}(t).$$

6. (original) A combiner according to claim 5 wherein said phase accumulator comprises a normalizer component configured for producing a normalizing signal for normalizing said accumulation vector $(I_c(t-T), Q_c(t-T))$ following each said successive accumulation.

7. (original) A combiner according to claim 6 wherein the magnitude of said normalizing signal is substantially equal to $1/\sqrt{I_c^2 + Q_c^2}$.

8. (original) A combiner according to claim 6 wherein the magnitude of said normalizing signal approximates $1/\sqrt{I_c^2 + Q_c^2}$, said normalizer component comprising a bit register which receives the value of $I_c^2 + Q_c^2$ following each said successive accumulation and logic gates configured for determining a number "n" of bit shifts to be applied to $I_c(t-T)$ and $Q_c(t-T)$ to produce a normalized vector whose magnitude is between .5 and 1.0.

9. (original) A combiner according to claim 6 wherein said plurality of diversity signals comprise two diversity I and Q modulated signals.

10 (original) A combiner according to claim 7 wherein said diversity signals are spatial diversity I and Q modulated signals.

11. (currently amended) A combiner according to claim 3 wherein said phase accumulator is configured for deriving the arctangent of the vector $I_c(t-T) + j Q_c(t-T)$, adding the derived angle to said accumulation vector's phase (modulo 2π) and applying a cosine and a sine function to the resulting angle to produce said combined I and Q signal pair (I_c, Q_c).

12. (currently amended) A method for combining a plurality of diversity baseband I and Q modulated signals each carrying an I and Q information signal, said modulated signals having been digitized at a sampling rate T and each I and Q signal pair representing a diversity I and Q vector, said method comprising the steps:

- (a) for each sample stream of said plurality of diversity I and Q vectors, discriminating each sample to produce a discriminated I and Q vector (I_Δ, Q_Δ) having a phase representative of the frequency of said information signal and an amplitude proportional to the power of said information signal;
- (b) producing a combined discriminated I signal ($I_{c\Delta}$) by adding together, for each set of sampled diversity vectors, said discriminated I signals (I_Δ) and producing a combined discriminated Q signal ($Q_{c\Delta}$) by adding together, for each set of sampled ~~sample of said~~ diversity vectors, said discriminated Q signals (Q_Δ), whereby said combined discriminated I and Q signals represent a combined discriminated vector ($I_{c\Delta}, Q_{c\Delta}$) having a phase which is determined by one or more of the phases of said diversity I and Q vectors depending upon the relative powers of said diversity I and Q vectors;
- (c) producing a combined I and Q signal pair (I_c, Q_c) by adding said phases of said combined discriminated vectors ($I_{c\Delta}, Q_{c\Delta}$) over successive samples.

13. (Currently amended) A method according to claim 12 whereby said ~~in said~~ discriminating step performs complex discrimination.

14. (Original) A method according to claim 13 whereby said diversity I and Q signals are FM signals.

15. (Original) A method according to claim 14 whereby said complex discrimination achieves the calculations:

$$I_{\Delta}(t) = I(t) I(t-T) + Q(t) Q(t-T); \text{ and,}$$

$$Q_{\Delta}(t) = I(t-T) Q(t) - I(t) Q(t-T).$$

16. (Original) A method according to claim 15 whereby said adding of said phases of said combined discriminated vectors ($I_{c\Delta}$, $Q_{c\Delta}$) achieves the calculations:

$$I_c(t) = I_{c\Delta}(t) I_c(t-T) - Q_{c\Delta}(t) Q_c(t-T); \text{ and,}$$

$$Q_c(t) = I_{c\Delta}(t) Q_c(t-T) + I_c(t-T) Q_{c\Delta}(t).$$

17. (Original) A method according to claim 16 whereby an accumulation vector ($I_c(t-T)$, $Q_c(t-T)$) is normalized following each successive addition.

18. (Original) A method according to claim 17 whereby said normalization comprises multiplying said accumulation vector by an amount substantially equal to $1/\sqrt{I_c^2 + Q_c^2}$.

19. (Original) A method according to claim 17 whereby said normalization comprises multiplying said accumulation vector by 2^n , whereby the value of "n" is determined such that the magnitude of said normalized vector is between .5 and 1.0.